IN THE SPECIFICATION:

Pursuant to 37 C.F.R. §§ 1.121 and 1.125 (as amended to date) please replace paragraph numbers **[0018], [0067], [0082], [0110], [0112],** and **[0121].** A marked-up version to clearly identify amendments to the specification as required by 37 C.F.R. § 1.121(b)(3)(iii) is attached.

Please replace paragraph **[0018]** with the following:

A1

[0018] As an example of a known partial rebreathing process, the NICO™ system offered by Novametrix Medical Systems Inc. of Wallingford, Connecticut, employs a 60 second baseline period, a 50 second rebreathing period, and a 70 second recovery period. The complete rebreathing cycle lasts for about three minutes. Another exemplary partial rebreathing process is disclosed in Capek, JM, and Roy, RJ, Noninvasive measurement of cardiac output using partial CO_2 rebreathing, IEEE Trans Biomed Eng 1988; 35:653-661. That rebreathing process has a total cycle time of about 3½ minutes, with the actual rebreathing phase lasting for about 30 seconds. Gama de Abreu, M, et al., Partial carbon dioxide rebreathing: A reliable technique for noninvasive measurement of nonshunted pulmonary capillary blood flow, Crit. Care Med. 1997; 25: 675-683, discloses a rebreathing process with a 35 second rebreathing phase and a total cycle time, including baseline and recovery phases, of about 3 minutes.

Please replace paragraph **[0067]** with the following:

A2

[0067] Since $CvCO_2$ may change over time, an accurate noninvasive Fick-based determination of the pulmonary capillary blood flow or cardiac output of a patient may include an estimation of the rate at which $CvCO_2$ changes. With an exemplary assumption that changes in $CvCO_2$ are substantially linear over the rebreathing cycle and, therefore, that the rate of change is constant, the rate of change in $CvCO_2$, represented as "k", may be determined with the following equation:

$$k = \frac{\Delta CvCO_2}{\Delta t}. \tag{10}$$

Alternatively, the change in carbon dioxide content of the venous blood may be assumed to substantially follow a curve of some other shape that is reasonably based on the character of the change in carbon dioxide content, such as an exponential curve, wherein the rate of change would also be exponential, or the curve of a polynomial. As another alternative, the rate of change in $CvCO_2$ may be approximated by an artificial neural network or a radial basis function, as known in the art.

A2

Please replace paragraph **[0082]** with the following:

[0082] The $PetCO_2$ of the patient is also measured for each of the "before", "during" and "after" phases. As $PetCO_2$, when corrected for parallel deadspace (of nonperfused alveoli), is assumed to be equal to the partial pressure of carbon dioxide in the alveolar blood (P_ACO_2) and the partial pressure of CO_2 in the arterial blood ($PaCO_2$), a carbon dioxide dissociation curve may be employed with the end tidal carbon dioxide partial pressure measurements, as known in the art, to determine the content of carbon dioxide in blood of the alveoli (C_ACO_2) of the lungs of the patient that participate in the exchange of blood gases, which alveoli are typically referred to as "perfused" alveoli, for each of the before, during, and after rebreathing phases. C_ACO_2 is assumed to be equal to the content of carbon dioxide in the arterial blood ($CaCO_2$). FIG. 4 is a graph that illustrates the $PetCO_2$ measured during each of the before, during, and after phases of the rebreathing process of the present invention.

A3

Please replace paragraph **[0110]** with the following:

[0110] Another exemplary method for modifying data in the best-fit line method is depicted in FIGs. 8A and 8B. As with the filtering and clustering methods for modifying data, the method depicted in FIGs. 8A and 8B includes selection of data points that are most likely to facilitate an accurate determination of the location and orientation of a best-fit line and, thus, of the pulmonary capillary blood flow or cardiac output of a patient. This method for modifying data includes iteratively examining data points and the distribution of the remaining data points relative to the two lines representing the range of possible pulmonary capillary blood flow measurements.

A4

Please replace paragraph **[0112]** with the following:

[0112] Next, the number of other data points 130 located between lines 110 and 120 is determined. If the number of data points 130 between lines 110 and 120 is equal to or exceeds a threshold number, the analyzed data point 130 is retained for a subsequent determination of the location and orientation of a best-fit line through the data. Otherwise, the analyzed data point 130 is discarded. The threshold number of data points that must be located between line 110 and line 120 for an analyzed data point to be retained may be a predetermined value or determined by other means. As an example, the threshold number may be set to the median number of data points that are located between line 110 and line 120 when each data point 130 of a set of data points 130 has been evaluated in accordance with the present embodiment of the method for modifying data. This process is repeated until each data point 130 in a set of data points 130 has been so evaluated. FIG. 8A depicts use of the data modification method on a data point 130 that will be retained, while FIG. 8B illustrates use of the present embodiment of the data modification method on another data point 130′ that will not be retained.

A5

Please replace paragraph **[0121]** with the following:

[0121] The relatively short phases of differential Fick techniques incorporating teachings of the present invention, as well as the lack of a recovery or stabilization period, facilitate the calculation and, thus, reporting of noninvasive pulmonary capillary blood flow or cardiac output measurements with increased frequency over that possible with previously known differential Fick techniques. For example, when conventional partial rebreathing techniques are employed, pulmonary capillary blood flow and cardiac output values can only be updated as frequently as the cycle time for these methods, which is typically three minutes or longer. In contrast, when the differential Fick method of the present invention is embodied as a partial rebreathing process with rebreathing and nonrebreathing phases that last about thirty seconds, the pulmonary capillary blood flow and cardiac output of a patient can be updated following the completion of each phase, or about every thirty seconds.

A6

Please replace the Abstract on page 51 with the following:

A differential Fick technique including a first phase in which baseline breathing parameters may be established and a second phase in which a change in the effective ventilation of a patient is induced. The durations of the first and second phases may be substantially the same and may be abbreviated relative to the durations of comparable phases of previously known differential Fick techniques. The disclosed differential Fick technique also lacks a recovery period in which the respiratory parameters of a patient are permitted to return to "normal" levels.

A7